

## FIELD EFFECT TRANSISTOR WITH ETCHED-BACK GATE DIELECTRIC

### ABSTRACT

A method for making an ultrathin high-k gate dielectric for use in a field effect transistor is provided. The method involves depositing a high-k gate dielectric material on a substrate and forming an ultrathin high-k dielectric by performing a thinning process on the high-k gate dielectric material. The process used to thin the high-k dielectric material can include at least one of any number of processes including wet etching, dry etching (including gas cluster ion beam (GCIB) processing), and hybrid damage/wet etching. In addition to the above, the present invention relates to an ultrathin high-k gate dielectric made for use in a field-effect transistor made by the above method.